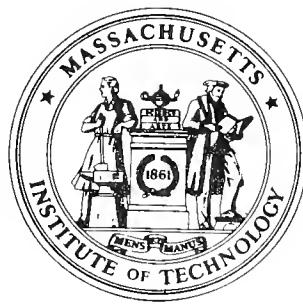


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THE ANGLO-AMERICAN BUSINESS CYCLE, 1820-1860

Peter Temin

Number 84

April 1972

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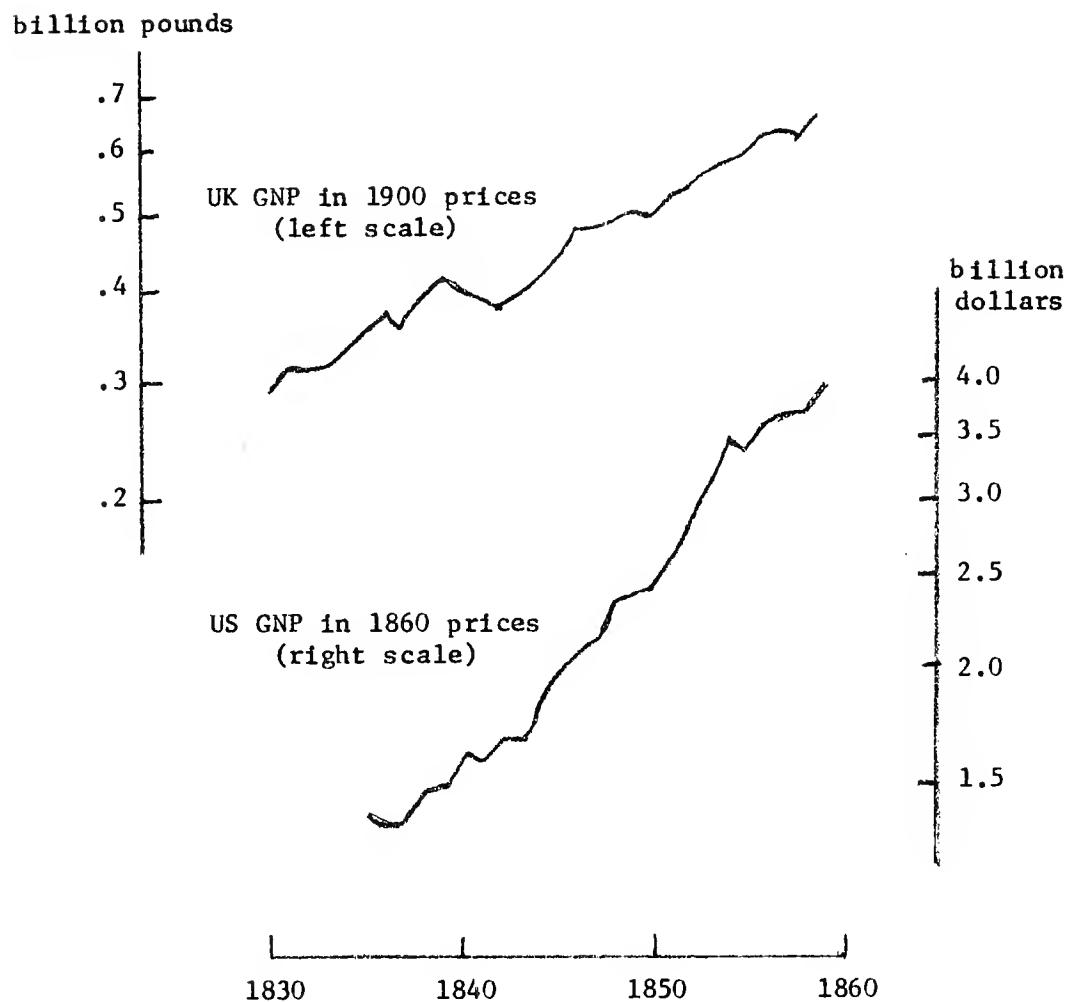
This research was supported by a grant from the National Science Foundation. All errors remain mine.

## THE ANGLO-AMERICAN BUSINESS CYCLE, 1820-1860

Despite a number of monographs on aggregate economic fluctuations in the period between the Napoleonic and American Civil Wars, there is no general view of fluctuations either in the United States or in the United Kingdom.<sup>1</sup> There also is no general agreement on the nature of interaction between these two countries, although the similarity of their fluctuations has not escaped attention. J. Williamson analyzed Anglo-American capital and gold flows in his account of international aspects of long swings in the United States, but his work is of limited use for the question at hand. He tried to construct a general theory for the entire nineteenth century, in which the singular characteristics of the ante-bellum period appear as exceptions.<sup>2</sup> But it is precisely those "exceptions"--the reliance of the United States on silver as opposed to gold during the 1830's and the importance of gold mining in the United States during the 1850's--that are of interest here. In a more specific attempt to explain fluctuations in the ante-bellum United States, Hughes and Rosenberg concluded only that "a new approach is needed."<sup>3</sup> The purpose of this paper is to supply a general view of the interaction of the United States and England from the 1820's to the American Civil War.

We begin by review of the aggregate economic data, not all of which were available to the authors of the monographs cited above. Figure 1 shows estimates of real GNP in the United States and the United Kingdom. Both series exhibit a strong and steady trend, with the rate of growth of GNP being substantially higher in the United States than in the United Kingdom (five percent as opposed to two percent). Despite the strong trend, there is evidence of significant autocorrelation of the deviations from the trend in both cases.<sup>4</sup>

Figure 1  
**Real Income in Britain and the United States**



Sources: Phyllis Deane, "New Estimates of Gross National Product for the United Kingdom, 1830-1914," p. 106; Robert Gallman, private correspondence.

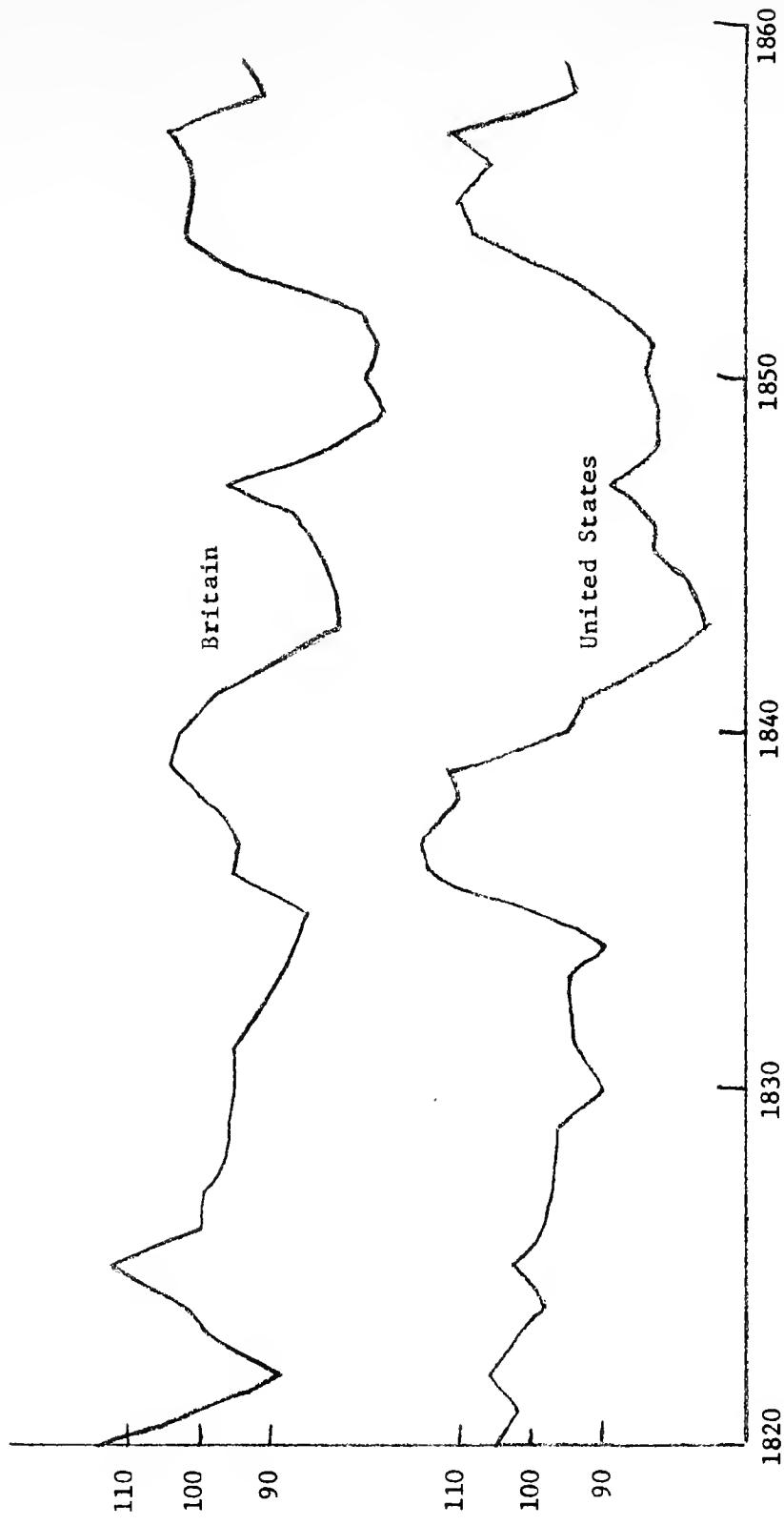
This gives the appearance of cycles, although I do not mean to suggest the existence of any self-generating cycles. The deviations from trend are most pronounced in the English data for the 1830's and 1840's; the rise above the trend in the 1830's and the fall below it in the 1840's are quite apparent. This movement is echoed in the American data, but the movement is not quite so clear because of the stronger trend. The 1850's do not present as sharp a picture although there is a dip in the English data in 1858 and a slow-down in the rate of growth in the U. S. data in the same year. The peak in the American data in 1854 finds no echo in the English data.

Data on prices in the two countries are presented in Figure 2. The familiar cycles of the ante-bellum period are apparent here: high prices in the 1830's and 1850's, low prices in the 1820's and 1840's. The similarity between the price movements in the two countries is quite striking, although the ratio between the two prices did not remain constant over this period. Figure 3 shows the ratio of the prices in the United States to prices in the United Kingdom. The extreme values of this ratio were roughly 20 percent above and below the mean in 1837 and 1843-44 respectively, and the ratio tended to be high when prices were high and low when prices were low.

These data and the monographic evidence give rise to two hypotheses. First, the booms of the 1830's and the 1850's were caused by separate, independent "shocks" to the Anglo-American economic system, and differences between them can be attributed to the differences in the shocks. Second, prices were determined by very different mechanisms in Britain and America; they were related much more closely to specie supplies in the latter country than the former. These hypotheses will be supported first by a narrative and then by a simple econometric model of Anglo-American price formation, 1822-59.

Figure 2

Prices in Britain and the United States

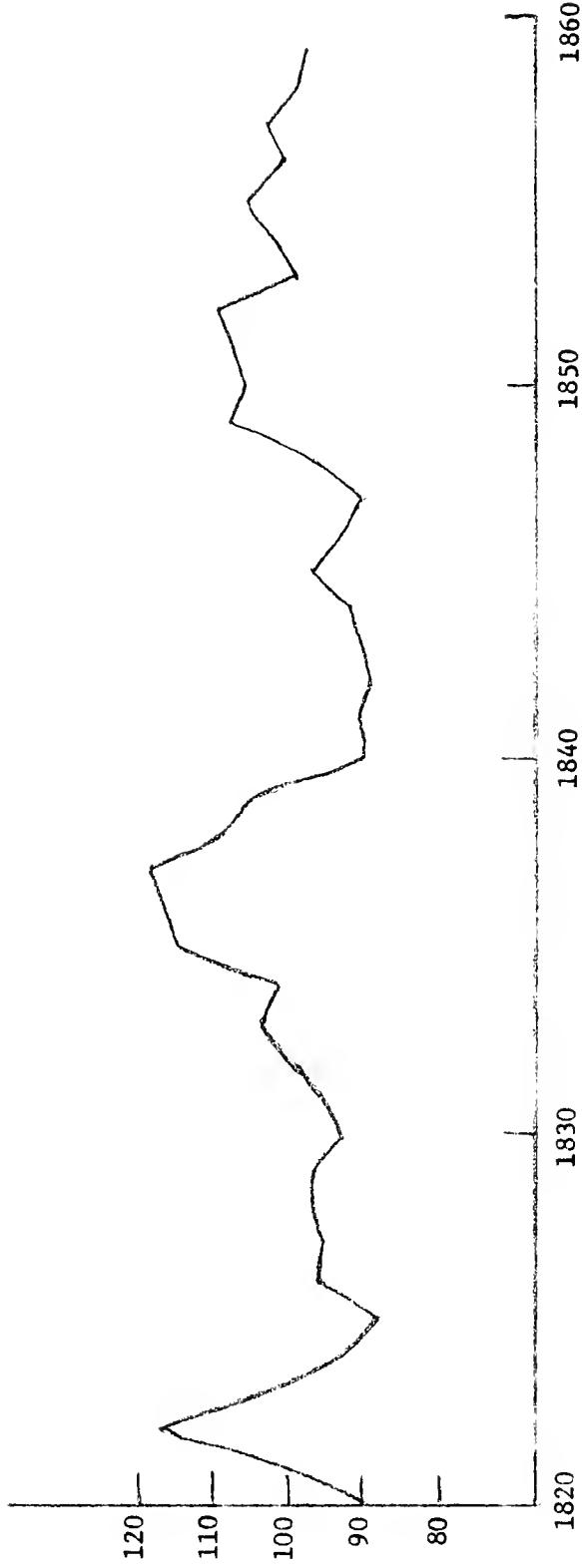


Sources:

The Warren and Pearson price index was used for the United States; the Gayer-Rostow-Schwartz index was linked to the Saurbeck Index at 1850 for Britain. U. S. Bureau of the Census, Historical Statistics of the United States (Washington, 1960), p. 115; B. R. Mitchell and Phyllis Deane, Abstract of British Historical Statistics (Cambridge: Cambridge University Press, 1962), pp. 470-74.

Figure 3

Ratio of United States Prices to British Prices



Source: Figure 2.

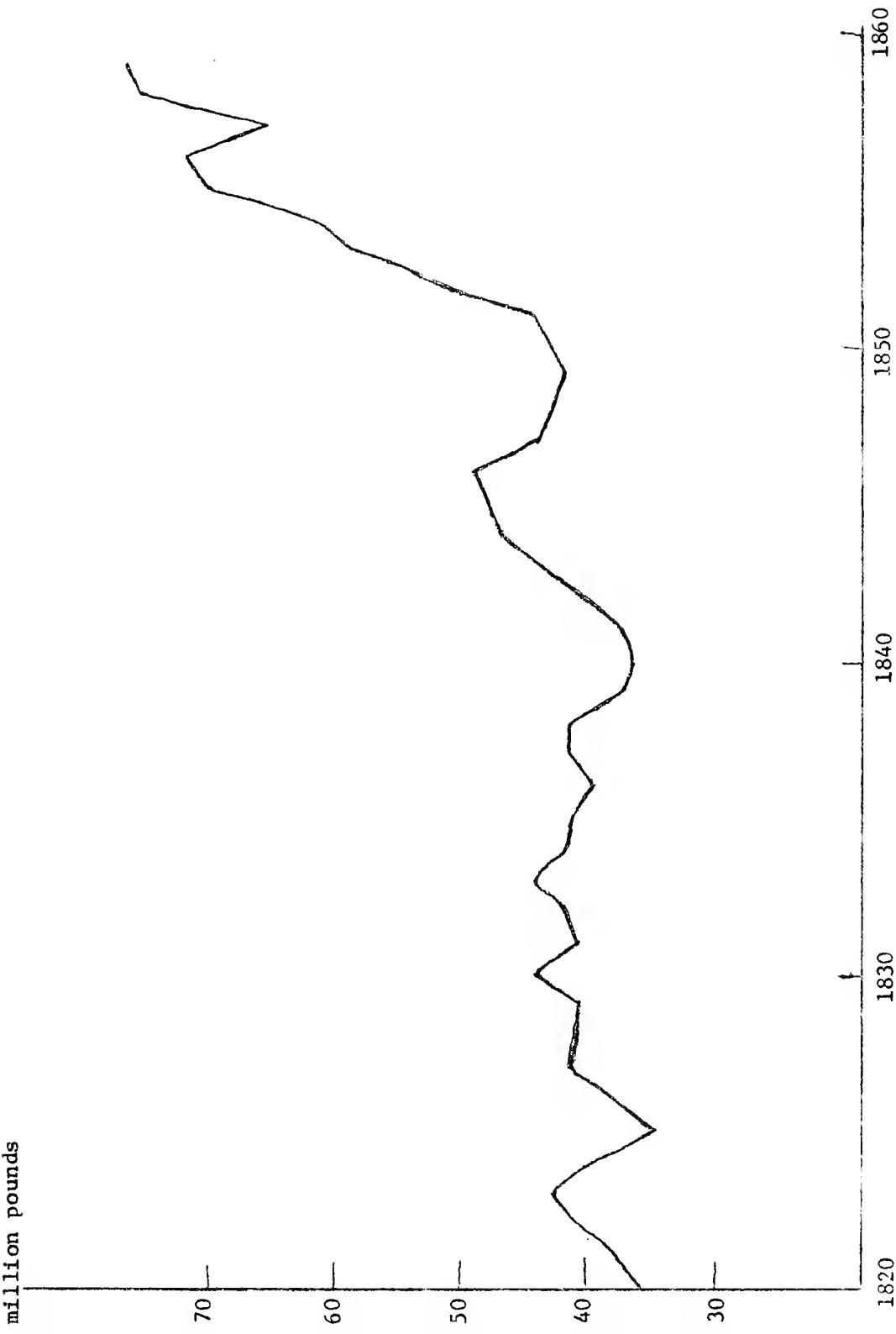
The English GNP grew more rapidly than its trend in the 1830's because of an expansion in domestic investment. As R. C. O. Matthews, the author of the classic monograph on this cycle, said, "the mainstay of the British cycle was domestic investment."<sup>5</sup> According to Matthews, the rise of investment had three main causes. First was the influence of the Liverpool and Manchester Railway which was completed in 1830. This railroad was the first one to demonstrate the commercial success of railway ventures, and it gave rise to a rash of imitations. In addition, there was investment in the cotton industry, started by the exhaustion of what Matthews called "semi-reserve capacity," that is, floor space for more looms. The large buildings constructed in previous periods had excess room in them, into which more looms were placed, as business expanded. By the beginning of the 1830's there was no more room for additional looms. A rise in the rate of investment was then necessary for the continuation of a steady rate of expansion of output. Finally, investment and other economic activities were aided by a string of good harvests in the early 1830's.<sup>6</sup>

The model for the rise in the United Kingdom income therefore is a multiplier process in which an autonomous rise in investment leads to a rise in income. The rise in investment was composed of several independent movements, among which the rise in investment in railroads was the most important. Investment in transport and communications was 40 percent of total domestic fixed capital formation in the period from 1835-44 while the investment in industrial capital, including gas, electricity and water, was only 20 percent.<sup>7</sup> Investment in the cotton industry, which was only a part of this 20 percent, had less important macroeconomic implications than the railroad boom.

The expansion of aggregate demand also led to a rise in prices. The

rise in prices was not considered in detail by Matthews because he asserted that the price index he used, which is less comprehensive than the one shown in Figure 2, contained largely agricultural and imported goods and therefore needed to be discussed in conjunction with imports.<sup>8</sup> However, even though price indexes are biased toward particular kinds of goods, we need to explain how the prices of these goods could rise. There are two possibilities. Either the prices of manufactured goods and services fell so that the rise in the price of agricultural and imported goods was simply a change in relative prices, or the prices of other goods rose with the prices of recorded commodities, and aggregate price level rose. The first alternative can be dismissed out of hand. There is no evidence at all of a decline in the price of domestic manufacturing or of services, and such evidence as we do have indicates that their prices rose. The second possibility then is to be considered, and it raises a question of some importance. How could the aggregate price level rise in the 1830's?

The monetary system at that time was based on reserves of precious metals. There does not seem to be any good index of the supply of bullion in the United Kingdom, but we can construct a crude estimate by cumulating Imlah's data on net imports of bullion into the United Kingdom and setting the initial value at some arbitrary level. This is shown in Figure 4, where it can be seen that the supply of bullion in the United Kingdom did not rise at all during the inflation of the 1830's. For prices to have risen at the same time as national income, it must have been possible either to expand the money supply on the basis of a fixed volume of reserves or else to markedly increase its velocity. Without data on the money supply we cannot discriminate between these hypotheses, but the latter appears to be the more probable. It was made possible by the



Source: See text. Note that the level is arbitrary.

integration of the English capital market. When short-term funds became scarce in London it was possible to mobilize idle funds from the provinces. Therefore a credit stringency in the capital did not serve to reduce bank credit but rather to expand the supply.<sup>9</sup>

Although Matthews did not say explicitly, the underlying model is the Keynesian liquidity trap. The English country banks were in touch with the London and Liverpool capital markets. The hypothesis of irrationality, that is, that country banks did not know what to do with their money (except in times of crisis) can be rejected from what we know of communications in England. The alternative explanation for idle balances is Keynes' liquidity preference. We must assume that the demand for money was very elastic at the interest rates prevalent in the early and mid-nineteenth century. Small shifts in the interest rate, caused perhaps by changes in the demand for active balances deriving from the state of trade, could induce movements of funds into or out of idle balances. It should be noted that this nineteenth-century liquidity trap differs in important respects from its twentieth-century analogue. Because information flows were slower and less reliable, it occurred at a comparatively high rate of interest--about three or four percent. And since prices were more flexible then than now, its influence was stronger on the determination of prices than on the determination of employment.

This solution to the question of how prices could have risen raises an additional question. If the supply of active balances in the United Kingdom was very elastic and not determined by the supply of specie, then what determined the price level? It is possible that the price level was determined by the requirements of trade and the supply of credit in nominal terms was then determined to conform to it. We will return to this hypothesis.

An American boom originated at roughly the same time as the English boom, based also on transportation innovation. The Erie Canal, finished in 1825, gave rise to a host of imitators, much as the Liverpool and Manchester Railway did in England slightly later. There does not seem to be any compelling technical reason why the Erie Canal and the Liverpool and Manchester Railway were completed at roughly the same time. However, I think we can say that the temper of the time created an environment favorable to innovation in transportation. In any case, the boom in the United States, involving as it did motivation similar to the boom in the United Kingdom, attracted English capital. The ratio of net foreign investment to GNP in the United Kingdom did not rise during this period, but the flow was redirected in large part from South America to the United States.<sup>10</sup> As a result of the inflow of capital, the boom in the United States was extended and prolonged. The inflow of funds raised real income above its trend and increased prices.

This process looks very much like the classical price-specie-flow mechanism, but of course it is not, because specie did not actually flow from the United Kingdom to the United States. The actual process involved silver mining in Mexico and opium trading in China. In the absence of a capital flow from England to the United States, people in the United States would have sent Mexican silver to China to pay for Chinese goods. The Chinese then would have used the silver to pay British traders for opium from India. With the capital flow and with the price-specie-flow mechanism operating, this silver would have returned to the United States. The credit market of the early nineteenth century was sufficiently sophisticated to allow the silver to remain in the United States and the remaining operations to be done on paper. The rise in specie reserves in the United States led to rising prices.<sup>11</sup>

The boom in England ended because of a decline in domestic investment. The reasons for the decline in English investment, however, are unclear. The end of the American boom could have led to a fall in foreign investment if it was not the result of such a fall, but it is hard to see how it could have led to a fall in domestic investment. In addition, it seems clear that the decline in the United States was due to the fall in capital imports.<sup>12</sup> If there was an accelerator process operating in England, in addition to the multiplier process already described, this could have produced a fall in investment, but the data do not justify the assumption that this process existed. As is well known, the multiplier-accelerator process will produce a heavily damped cycle in aggregate output for reasonable values of the parameters. Consumption at this time was about nine-tenths of the national product. To have an endogenous cycle, the accelerator coefficient would have to be above .5, that is, every rise in consumption of one pound would have had to call forth ten shillings of investment. There is no a priori reason why this could not have been so, but the data do not confirm it. Consumption rose by 55 million pounds from 1834 to 1839, but domestic investment only rose by 16 million pounds. If year to year variations are considered, no significant correlation of investment and changes in consumption is observed.<sup>13</sup>

Similarly, the hypothesis that investment fell due to a restriction of credit will not stand. If Matthews is right and the supply of credit in London was very interest-elastic, then the restrictions by the Bank of England at the end of the 1830's could not have had much of an effect on investment. If a rise in Bank rate did not even affect the availability of short-term credit, it surely could not have affected the availability of long-term credit. We are left, therefore, with the hypothesis of a "ceiling" in the availability of investible

resources. If the cycle was not caused by monetary phenomena or by a linear interaction among the real variables, it must have been caused by a non-linear interaction, such as one in which there is a full-capacity ceiling on activity. The British GNP was about six percent above its long-term trend in 1839. There clearly was some slack in the British economy at this time due to unemployment, but we may presume that this slack was exhausted--in the short run--by a deviation from the trend of that size.

The picture for the 1850's is completely different. There was, as in the 1830's, an exogenous shock to get the boom going, but while the shock in the 1830's was an increase in the marginal efficiency of capital leading to an increase in real investment, the shock in the 1850's was an increase in the supply of bullion reserves in the Atlantic economy. Gold was discovered in the United States and in Australia. The immediate impact of the gold discoveries in the United States was to raise American prices. This then led to an increase in imports from England. With rising prices and an ability to pay, the American market looked like a favorable haven for British capital. The imports therefore were paid for partly in gold, but partly also in credit. The export of gold from the United States allowed British prices to rise. The import of capital by the United States meant that, as in the 1830's, American prices rose more than British prices.<sup>14</sup>

There has been some controversy about the effect of the gold discoveries on the British price level. This was started by Newmarch who asserted that the gold flowed into England and then out again, encouraging an expansion of income, but not a rise in prices. This was contested within a generation by Jevons whose opinion has held the day. It is quite clear from the data in Figures 1 and 2 that Jevons was right and Newmarch wrong. British national

income in the 1850's did not rise at a faster rate than income in the 1840's while British prices undoubtedly did.<sup>15</sup> As can be seen from Figure 4, the inflation in the 1850's was accompanied by a rise in the reserves in England while the inflation of the 1830's was not. The inflation of the 1850's may appear similar on the surface to the inflation of the 1830's, but it was in fact quite different. The boom of the 1850's was a phenomenon solely of prices; the boom in the 1830's was also a boom in real income.

We return now to the two hypotheses posed above. We do not have enough data to test further the assertions already made about movements in real income, but we can subject the description of price movements to statistical tests. The price level in the United States can be explained very well by prices in the United Kingdom and capital imports into the United States, coming mostly from the United Kingdom. This can be expressed in the following simple regression for 1822-59 (where the "t" statistics are shown below the coefficients, and CM is a three-year sum of U. S. capital imports):<sup>16</sup>

$$(1) \quad P_{US} = 36 + .61 P_B + .14 CM \quad \bar{R}^2 = .80, \quad DW = .8$$

[6.8] [7.5]

The coefficients are both highly significant, and the regression explains a high proportion of the variance of prices in the United States. There is evidence of serial correlation in the residuals, indicating that the predicted price does not have as large cyclical fluctuations as the actual price. This characteristic unfortunately is shared by all the equations estimated here.

To pursue the explanation, we need to explain the British price level and capital imports to the United States. The latter can be explained only in the roughest sense along the lines suggested in the narrative. Capital imports to the United States came largely from Britain as far as we know. However, capital imports to the United States were not significantly correlated--in fact,

not correlated at all--with total capital exports from the United Kingdom.<sup>17</sup>

The influences that led to capital imports to the United States therefore were influences that shifted the direction of English capital exports rather than those variables that affected the overall level of capital exports.

These conditions can be known only approximately, particularly if the direction of international capital movements was strongly influenced by fashions and fads.<sup>18</sup>

The explanation of the British price level poses questions of a different order. The preceding discussion has argued that the active money supply, and by implication the price level, is only explained by the supply of monetary reserves to a very limited extent. It was suggested above that the British price level may have been determined by events abroad rather than by the monetary base within the United Kingdom. This can be tested (under certain assumptions) by turning the regression above around and regressing the British price level on the American price level and capital imports to the United States, used here as a proxy for capital exports from the United Kingdom to the United States.

$$(2) \quad P_B = 5.0 + .94 P_{US} - .10 CM \quad \bar{R}^2 = .60, \quad DW = .8$$

$$[6.8] \quad [3.0]$$

The  $\bar{R}^2$  is lower here than in the American case, but the coefficients are both significant and of the right sign. (For a given price level in the United States, prices are lower in England when capital is flowing from England to America.) We cannot expect the British price level to have been completely determined by its relations to the United States, although that relationship is the most well documented. Accordingly, it appears to be evidence for the existence of an "Atlantic Community" that we can explain as much as three-fifths

of the variation in the English price by reference to only one trading partner. For this evidence to be valid, however, we must be sure that the direction of causation was only from prices in the United States to prices in Britain. If the prices in the two countries were jointly determined, the use of simple regressions like equation (2) can be misleading.

Taking capital movements as exogenous, we now have to find a new explanation of the American price level. The American money supply and consequently the American price level was more closely connected to the reserve base than was the case in England. It was not completely determined by the reserve base, and one might expect the other determinants to be related in part to the level of national income. A regression of the United States price level on the specie supply in the United States and American GNP for 1835-59 (the longest period for which the GNP data exist) yields the following result:<sup>19</sup>

$$(3) \quad P_{US} = 149 + .15 S_{US} + .03 Y_{US} - 5.4 t \quad \bar{R}^2 = .67, \quad DW = 1.3$$

[2.3] [2.0] [5.9]

A time trend has been added to this regression to offset the trend in income and specie supplies. It can be regarded as the sum of the trends in velocity and in the ratio of the money supply to the specie supply.<sup>20</sup> Both principal variables in this regression are significant at the 5 percent level. If either of them is used alone it has a considerably higher "t" statistic and the  $\bar{R}^2$  does not fall very much. But for the entire period 1822-1858, for which we do not have income data, the specie stock by itself explains only one-third of the variance of the American price level. For reasons that will emerge shortly, this apparent short-coming of the explanation of American prices should not be taken seriously.

$$(4) \quad P_{US} = 107 + .12 S_{US} - 1.4 t \quad \bar{R}^2 = .32, \quad DW = 0.6$$

[4.2] [4.4]

If we adopt this explanation of the American price level, that is, that it is determined largely by the supply of gold and silver in the country, then we are forced to explain the size of the specie holdings in the United States. And, as has been brought out in the discussion, it was the result both of Anglo-American capital movements and of the relative price levels in the United States and Britain. The process must have been something like this. The distribution of specie between England and the United States was determined by international capital movements and relative price levels. The specie remaining in the United States determined the American price level, and the requirements of the balance of payments determined the British price level, which could vary widely for a given volume of reserves due to the great "elasticity" of the English velocity of money. The price levels then had a further effect on the distribution of specie. The price-specie-flow mechanism is a bad description of what went on in the period from 1820 to 1860, but it is a good theory to use to unravel the relationship between prices in the different countries.

This conclusion implies that the price levels in the United States and Britain were simultaneously determined by international capital flows and the supply of specie. It follows that the equations reported above were incorrectly estimated because they did not take account of this simultaneity. A system of equations can be specified that will take account of this feature of history, but we cannot hope to get an accurately specified simultaneous system for the early nineteenth century. The data simply are not available. Nevertheless, an incomplete system is better than none.

We start from the thought behind equation (4), that is, that the American price level was determined by the supply of specie in the United States and a time trend.

$$(5) \quad P_{US} = f(S_{US}, t), \quad f_1 > 0, \quad f_2 < 0.$$

(We do not start from equation (4) itself, because the estimation of this equation ignored the fact that the specie stock of the United States was partially dependent on the United States price level.) The effect of the specie stock on the price level is indirect, and it would be preferable to enter the ratio of the specie stock to the money supply, the velocity of money, and the level of national income directly into the equation, instead of subsuming them under a time trend and a random error. These variables, however, cannot be regarded as exogenous, and we do not have data on their determinants. It will be seen that this simplification of the specification does not cost a great deal in terms of explanatory power of the model. (Since the specie stock rose for the period as a whole and the price level did not, the net effect of the omitted variables is negative.)

The specie stock in the United States was determined by the price levels in both the United States and England, the capital flows from England to the United States (CM), and the supply of specie to the two countries taken together ( $S_T$ ).

$$(6) \quad S_{US} = g(P_{US}, P_B, CM, S_T), \quad g_1 < 0, \quad g_2 > 0, \quad g_3 > 0, \quad g_4 > 0.$$

The supply of specie available to both countries is taken to be exogenously determined by mining and activities in the Far East. This ignores specie flows from England to the continent of Europe, which were dependent on relative prices and capital flows, but data on these variables are not available. The capital flow is also assumed to be exogenous, because it is very hard to find systematic determinants of the direction of flow of capital.

The British price level, in contrast to the American, was determined

directly by the forces acting to equilibrate the balance of payments. If the prices of Britain's trading partners were high, the British price level could be high. And if British capital exports to a country were high, the British price level would be lower relative to the price of that country than if there were no capital flows. Lacking balance-of-payments data for the continental European countries, however, only capital exports to the United States (assumed equal to capital imports into the United States) and the price level of the United States appear in the equation.

$$(7) \quad P_B = h(CM, P_{US}, \dots), \quad h_1 < 0, \quad h_2 > 0.$$

If we assume that these equations are linear, or approximate them in this way, we can derive the reduced-form equations and estimate them for 1822-59 by least squares. Although the coefficients in these equations do not have immediate interpretations, the goodness of fit indicates how well the model as a whole works.

$$(8) \quad P_{US} = 97 + .18 CM + .04 S_T + .87 t \quad \bar{R}^2 = .75, \quad DW = 1.2$$

[8.2]      [3.6]      [5.1]

$$(9) \quad P_B = 95 + .06 CM + .04 S_T - .84 t \quad \bar{R}^2 = .29, \quad DW = .8$$

[1.9]      [2.6]      [3.4]

$$(10) \quad S_{US} = -88 + .09 CM + .58 S_T + 2.0 t \quad \bar{R}^2 = .99, \quad DW = .6$$

[1.6]      [18]      [4.3]

These equations perform well--measured by generally significant coefficients and the high proportions of variance explained--with two prominent reservations. The Durbin-Watson statistics are very low, in common with all the other estimated equations, and the  $\bar{R}^2$  for equation (9) is quite low. These defects are due to missing variables, and they are precisely the kind of defects to be expected given the incompleteness of the specified equations.

The British economy was intimately connected with the economies of more other countries than was the American, and a model that deals with only one other country consequently provides a less satisfactory explanation of the British price level than the American. And the absence of the determinants of domestic investment from the equations prevents us from attaining a complete explanation of economic fluctuations. Given these limitations, the equations look impressively good.<sup>21</sup>

Two of the three structural equations in this model are identified and can be estimated. While they look similar to equations (2) and (4) above, they are estimated by two-stage least squares instead of ordinary least squares. The estimated coefficients therefore are unbiased and preferable to the earlier ones.

$$(11) \quad P_{US} = 108 + .13S - 1.5 t \quad \bar{R}^2 = .32, \text{ DW} = .6$$

[4.3] [4.5]

$$(12) \quad P_B = 5.4 + .93 P_{US} - .10 CM \quad \bar{R}^2 = .60, \text{ DW} = .8$$

[4.6] [2.3]

The high asymptotic "t" statistics show that the variables included in these equations were in fact important determinants of the American and British price levels. Comparison of these equations with the earlier versions--equations (2) and (4)--shows that the simultaneous-equation bias in the earlier estimates of the coefficients was negligible.

Nevertheless, the earlier equations were very misleading. It appeared from equations (2) and (4) that we had found a good explanation for changes in the British price level and a decidedly partial explanation for changes in the American price level. But it can be seen clearly from the goodness of fit of equations (8) and (9), that the opposite is the case; the simultaneous

system of equations explains three-fourths of the variance of the American price level, but only about a third of the British variance. The reasons why the earlier equations were misleading are easy to see. They were regarded as separate, independent relations, but they were in fact part of a larger simultaneous system. The  $\bar{R}^2$  of equation (2) was higher than the  $\bar{R}^2$  of equation (9) because a high value of  $P_{US}$  was both a cause and an effect of a high value of  $P_B$ . The estimation of equation (2) could not discriminate between the two channels of causation, whereas equation (9) eliminates  $P_B$  as a cause. Similarly, the  $\bar{R}^2$  of equation (4) was lower than the  $\bar{R}^2$  for equation (8) because a high value of  $P_{US}$  was the effect of a high value of  $S$ , but a cause of a low value of  $S$ . These two phenomena fought with each other in equation (4); only the former is shown in equation (8).

We conclude, therefore, from equations (8) through (12) that the data support the model of price formation in these countries that was extracted from the monographic work on this period, particularly Matthews'. It provides a quite complete explanation of changes in American prices, and it shows important determinants of the British price level although it cannot claim to be anywhere near a complete explanation of changes in British prices. Given the complete absence of references to continental Europe, this is hardly surprising.

This model has supplied a description of price movements in Britain and America, without reference to income movements in these countries. It is hard to know how the introduction of income would alter the statistical results, because the model would have to be expanded considerably to allow for income movements. Unhappily, data limitations preclude this expansion, and we must introduce income changes into the story on an ad hoc basis. Let me therefore

summarize the argument by incorporating the analysis just concluded into an amended narrative of Anglo-American fluctuations before 1860.

The price rises in the 1830's and 1850's were both caused by an increase in the availability of specie. The first inflation was based on the decline of silver exports to the Far East; the second was based on the increase in American and Australian gold mining. The reasons for the capital flow from England to the United States during these two inflations, however, were quite different. In the 1830's, there was also a boom in real income based on investment in transport facilities. Had there been no rise in the supply of specie, the real boom probably would have taken place anyway, but without the attendant inflation. In the 1850's, there was only an inflation, and real incomes did not differ substantially from their trend (except for the anomalous rise in 1854 in the United States).

The difference between the two periods is not very marked for the United States, but is very clear for the United Kingdom, as is shown by the data in Figure 1. British real GNP departs from its trend in the 1830's, but not in the 1850's. The monograph by J. R. T. Hughes on England in the 1850's therefore is misleading in its self-conscious imitation of R. C. O. Matthews' classic monograph on the 1830's. While one can organize the story on the same headings, the story actually was quite different, and Hughes' emphasis on the costs of growth, the instability of income and the hazards of progress are misplaced.<sup>22</sup>

The boom of the 1830's came to an end in the early 1840's due to the inability of the British economy to support for long a rate of growth above the long-term trend. A decline in investment led to a decline in income in Britain and to a temporary decline in both total capital exports and capital exports to the United States. (When British foreign investment picked up in the

mid-1840's, it did not return to the United States.) The depression in England therefore was transmitted to the United States where it resulted in a decline in the rate of growth of income rather than in the level. The boom of the 1850's did not reach an end before it was terminated by the American Civil War in 1861.

Capital movements, which have not been explained systematically, seem to have been affected by a variety of variables. There was little flow across the Atlantic in the 1820's, and the rise in the 1830's was due to the simultaneity of the transport booms in England and America. It was facilitated by the availability of specie which allowed prices in the United States to rise to affect the transfer, but it was not initiated by the increase in specie. The flow in the 1850's, by contrast, appears to have been due to the California gold discoveries. As prices rose in the United States, and as imports from England grew, English investors turned their attention toward the United States. The interruption of capital exports to the United States in the 1840's was the result of a decline in total English capital exports only for the first years of the decade. For the decade as a whole, capital exports were as high as in the 1830's and 1850's, but the bitterness resulting from the suspension of interest payments by several American states in 1841-42 prevented the capital from coming to the United States.

It will be noticed that this account makes no reference to the Panics of 1837 and 1857. They were not very important for the cyclical history of this time. They were both short-term adjustments resulting from a temporary scarcity of bank reserves in an environment which had recently seen an enormous expansion in the supply of specie. In both cases, there was restriction of credit by the Bank of England and suspension of specie payments

by banks in the United States. In both cases also, there was severe discomfort and widespread bankruptcy at the time of the restrictions. In both cases, however, business expanded almost immediately and resumed its previous high level. The rebound in 1858 and 1859 is well known. The rebound in 1838 is less well known. It has been unappreciated because it was followed by renewed depression in 1839. The financial crisis of 1839 was caused by another temporary imbalance in specie supplies due to a bad harvest in England. It was coincident with the end of the boom in domestic investment and therefore has clouded the lack of effect of the earlier panic.<sup>23</sup>

The 1825 and 1847 Panics in the United Kingdom and the 1834 crisis in the United States were even less important. They show up as small rises in the price series, but they are not very evident in the income series. They take place, with the exception of the rather minor 1834 crisis, at times of small capital flows from Britain to the United States, that is, at times when the markets were relatively isolated from each other. The effects were confined in geographic scope, and they were limited in duration like the more celebrated panics in 1837 and 1857.

## FOOTNOTES

This research was supported by a grant from the National Science Foundation.

All errors remain mine.

1. There are separate monographs for the United States and Britain in the 1830's and for each of these two countries in the 1850's. They are (in that order): Peter Temin, The Jacksonian Economy (New York: Norton, 1969); R. C. O. Matthews, A Study in Trade-Cycle History: Economic Fluctuations in Great Britain, 1833-42 (Cambridge: Cambridge University Press, 1954); George V. Van Vleck, The Panic of 1857 (New York: Columbia University Press, 1943); J. R. T. Hughes, Fluctuations in Trade, Industry and Finance (Oxford: The Clarendon Press, 1960).
2. Jeffrey G. Williamson, American Growth and the Balance of Payments, 1820-1913 (Chapel Hill: University of North Carolina Press, 1964). Some of his conclusions for this period also have been questioned. See Peter Temin, "The Economic Consequences of the Bank War," Journal of Political Economy, 76 (March/April, 1968), 260.
3. Jonathan R. T. Hughes and Nathan Rosenberg, "The United States Business Cycle before 1860: Some Problems of Interpretation," Economic History Review, 15 (December, 1963), 493.
4. The Durbin-Watson statistics from regressing  $\log(Y)$  on time are .8 for both countries.
5. Matthews, p. 219.
6. Ibid., pp. 28-30, 108-09, 134-36.

7. Phyllis Deane, "New Estimates of Gross National Product for the United Kingdom, 1830-1914," Review of Income and Wealth, 14 (June, 1968), 101.
8. Matthews, p. 8.
9. Ibid., pp. 182-200.
10. Deane, p. 99; Leland H. Jenks, The Migration of British Capital to 1875 (New York: Knopf, 1927), Chapter 3.
11. Temin, The Jacksonian Economy, pp. 79-82.
12. Ibid., pp. 148-55.
13. To reproduce Samuelson's classic model, we had to express consumption as a function of last year's income. It is this ratio that equals .9. There are alternate models that can produce cycles, but the results with this specification did not encourage further exploration. The data are from Deane, p. 106; the model appeared first in Paul A. Samuelson, "Interactions between the Multiplier Analysis and the Principle of Acceleration," Review of Economic Statistics, 21 (May, 1939), 75-78.
14. The story for Australia appears to have been similar, but we do not have data for capital flows from England to Australia, and the qualitative evidence is not clear. Capital exports to the United States in the 1850's amounted to about one-fourth of the total British capital export. The remainder could have gone in part to Australia. For an account of financial developments in Australia, see S. J. Butlin, Australia and New Zealand Bank (London: Longmans, 1961), Chapter 8.
15. This appears to be Hughes' conclusion, even though his discussion preceded the appearance of Deane's data. Hughes, pp. 14-17.

16. The Warren and Pearson price index was used for the United States; the Gayer-Rostow-Schwartz index was linked to the Saurbeck index at 1850 for Britain. U. S. Bureau of the Census, Historical Statistics of the United States (Washington, 1960), p. 115; B. R. Mitchell and Phyllis Deane, Abstract of British Historical Statistics (Cambridge: Cambridge University Press, 1962), pp. 470-74. United States capital imports were taken from Douglass C. North, "The United States Balance of Payments, 1790-1860," Trends in the American Economy in the Nineteenth Century, Studies in Income and Wealth, Volume 24 (Princeton: Princeton University Press, 1960), p. 581.
17. The data are Imlah's. Mitchell and Deane, p. 333. This conclusion is not affected by lagging, smoothing, or otherwise manipulating the series. The correlation of capital imports to the United States and capital exports from the United Kingdom is below .1 no matter how it is done.
18. See Jenks, passim.
19. The income figures are Gallman's unpublished data. The estimate of the specie stock was constructed by the method used for Britain. It is very close to the official one. Temin, The Jacksonian Economy, pp. 185-88.
20. It does not matter much for the results whether the time trend is taken to be linear as shown or exponential. In general, the fits were poorer when logarithmic relations were used.
21. Adjusting for the autocorrelation of the residuals reduces the "t" statistics somewhat, but does not change the estimated coefficients. Since there is no reason to think that the process of price determination is autocorrelated, however, this procedure does not lead us toward the correct model which contains variables omitted here for lack of data.

22. See Hughes, pp. vii, 289.

23. Temin, The Jacksonian Economy, Chapters 4, 5.









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